

A new genus and species of spoon-wing lacewing (Neuroptera: Nemopteridae) from Namaqualand, South Africa.

by

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A new genus and species of spoon-wing lacewing, *Knersulaktia nigroptera*, is described from adults collected from the quartz plains near Van Rhynsdorp, Namaqualand. The combined presence of the following features distinguish this genus from the other 10 known nemopterine genera; pleuritocavae (eversible vesicles) in the male, hairy head (particularly in the male), hairy antennal base (bristly in the female), and very broad and short richly pigmented forewings.

INTRODUCTION

South Africa has an extremely rich nemopterid fauna, with most species found in the arid western and south-western regions (Tjeder, 1967). Both subfamilies, the Crocinae and the Nemopterinae, were monographed in great detail by Tjeder (1967). Since then, a number of papers have been published on the taxonomy and biology of the South African Crocinae (Mansell, 1976, 1977, 1980, 1981a, 1981b). In contrast, only a single publication dealing with the Nemopterinae has been published since Tjeder's monograph: that by Mansell (1973), describing the larva of the unusual sand-dune inhabiting *Derhynchia vansonii*. The pronounced endemism of the Nemopterinae in South Africa (80% of the genera and about 90% of the species are endemic – Tjeder, 1967), combined with narrow habitat preference and brief seasonal emergence periods, make their discovery rather fortuitous. Habitat destruction appears to have caused the extinction of at least one genus and several species, particularly those described from the south-western Cape region. Many of these are described from single specimens captured 80–130 years ago and have never been refound. 56% of all South African species have only been captured once, or are restricted to a single habitat (Tjeder, 1967).

This paper describes a new genus and species of nemopterid from the Knersvlakte in Namaqualand, a biogeographical region noted for its endemism (Nordenstam, 1976; Werger, 1978). This brings the total number of nemopterine genera found in South Africa to 11. The terminology of Tjeder (1967) has been used throughout.

***Knersvlaktia* gen. nov.**

Type-species: *Knersvlaktia nigroptera* sp. nov.

Small nemopterines, hindwing just $2 \times$ forewing length. Forewings richly pigmented, pattern differing between the sexes. In the male, the entire forewing (except the apical tip) is suffused dark smokey brown. Rostrum long, $3 \times$ diameter of eye. Eyes small, similarly sized in both sexes. Antennae of medium length, just under $\frac{1}{2}$ length of forewing. Male with base of antennae and genae covered in long hairs (poorly developed in female). Pronotum as long as head. Legs of medium length. Venation typical of other nemopterine genera. Pterostigma distinct in both fore and hindwings. Hindwings narrow with no apical dilation. Mesonotum hairy in male. Abdomen short and thick. Males possessing pleuritocavae. Sternite 9 short. Ectoprocts with distinct callus cerci. Gonarcus forms a wide arch, with a single large mediuncus. Laminar expansions present on parameres. Parameres fused apically. Tergite 9 of female extends downward. The genus *Knersvlaktia* (neuter plural) is named after the geographical location of the species.

***Knersvlaktia nigroptera* sp. nov. Figs. 1–13.**

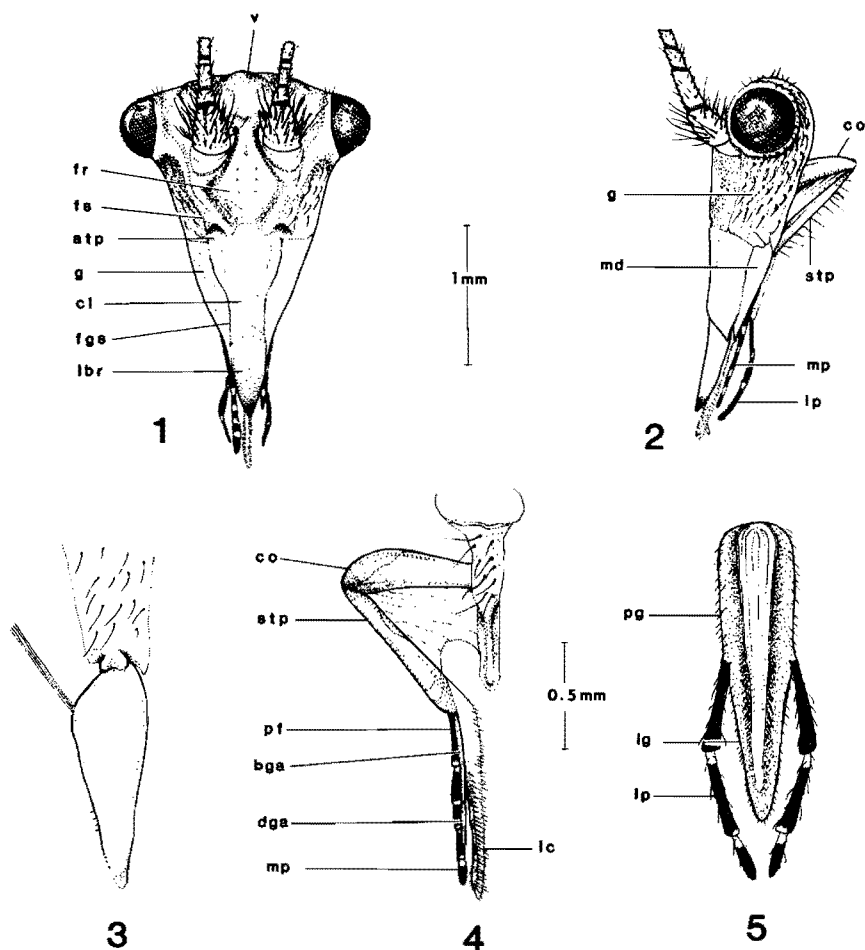
Measurements are all means in mm unless stated otherwise – ranges are given in brackets.

MALE. Length of body 8,5 (alcohol preserved), 5,3 (pinned). Forewing 14,9 (14–15,8); hindwing 31,5 (29,9–33,1); antennal flagellum 6,3 (5,3–7,5); rostrum 2,1 (1,95–2,34); eye diameter 0,7 (0,67–0,75). Holotype – forewing 15, hindwing 31,7, antenna 5,3, rostrum 2, eye diameter 0,7.

FEMALE. Length of body 6,8 (pinned); forewing 14; hindwing 28; antenna 5,3; rostrum 2,6; eye diameter 0,8.

Head (Figs 1 and 2) described from alcohol-preserved male. Frons pale yellow surrounded laterally by diamond-shaped brown markings near frontal suture; vertex and occiput brown. Rostrum, genae and mandibles tan, with tip of rostrum dark brown. Mouthparts (Figs 3, 4 and 5) tan, except for labial and maxillary palps which are almost black with white patches over intersegmental junctions. In the male genae covered in long, black hairs; in female genae smooth. Male with dense, long hairs around the eye, in the form of 'eyebrows': these are poorly-developed in the female. Antennae of medium length, just less than half length of forewing, ochreous and densely covered in short black setae along the entire length. Number of antennal segments in male – 44 (42–48). Female having 48 segments, setae not arranged in rings. Apical antennal segment narrowed to a point, longer in female and lacking unpigmented membranous area at tip in both sexes. Antennae hairy at base in male; setae longest on scape, diminishing in number and length along the pedicel and still present up to the fourth segment of the flagellum. In the female, short bristles take the place of the long setae found on the scape in the male.

Prothorax in the male pale brown with two central pale yellow stripes running longitudinally. Margins and anterior region covered in long black hairs. The prothorax in the female is rich brown with two broad citrine stripes running longitudinally. Black hairs on margins sparse and stiff and not as long as in the male.



Figs 1-5. *Knersulaktia nigroptera* gen. sp. nov. Head and mouthparts of ♂ 1. Head (frontal view). 2. Head (lateral view). 3. Left mandible (dorsal view). 4. Left maxilla (ventral view). 5. Labium (ventral view). fr - frons; fs - frontal suture; atp - anterior tentorial pit; g - gena; cl - clypeus; fgs - fronto-genal suture; lbr - labrum; md - mandible; co - cardo; stp - stipes; mp - maxillary palp; lp - labial palp; pf - palpifer; bga - basigalea; dga - distigalea; pg - palpig; lg - ligula.

Mesothorax in the male coloured light brown with faint pale yellow markings at the edges of sutures. Prescutum divided in half longitudinally by a thin brown stripe. At the junction of the mesoscutum and mesoscutellum is a large rectangular dark brown patch. Mesoscutum pale yellow with large pale brown central area. The prescutum is covered in dense, very long black hairs and the mesoscutum and mesoscutellum

are covered evenly in shorter black hairs. In the female mesonotum with a single median and two lateral brown stripes – otherwise citrine. Glabrous except for the anterior margin of the prescutum. Prescutum tan and divided longitudinally by a thin brown line. A few long black bristles present laterally. Colour citrine, with two thick brown central stripes. Mesoscutum citrine, with dark brown central rectangular patch and two lateral tan patches. Mesoscutellum citrine, with broad central longitudinal tan stripe.

Metathorax with postnotum taking the form of a wide transverse band, pale yellow with central brown suffusion. Metascutellum yellow with central dark brown markings. In the male, a patch of long black hairs is present on either side. In the female, only one or two hairs are present and the background colour is brighter. Enlarged, scale-like microtrichia absent.

Legs stout and of medium length, pale citrine and densely covered in short black bristles. Internal femoral regions with fewer setae than outer femoral surface. A patch of very short dense pale ochreous hairs is present on the ventral surface of the apical region of the fore tibia. This patch extends almost halfway up the tibia. Proximal tarsomere slightly shorter than combined length of other four tarsomeres. Paired tarsal claws short; black for most of their length, but yellow proximally.

Forewing colouration (Fig. 6) departing drastically from that of other African Nemopterids. All specimens examined have dense pigmentation covering most of the wing, save the apical tip. Wings very broad and short, slightly broader in female. In the male the deep brown tinge spreads unbroken over the forewing, save for hyaline patches in the centre of cells and deeper shading over cross veins: costal region brown. Just proximal to the pterostigma is an elongate brown patch. Similar-sized chalk white

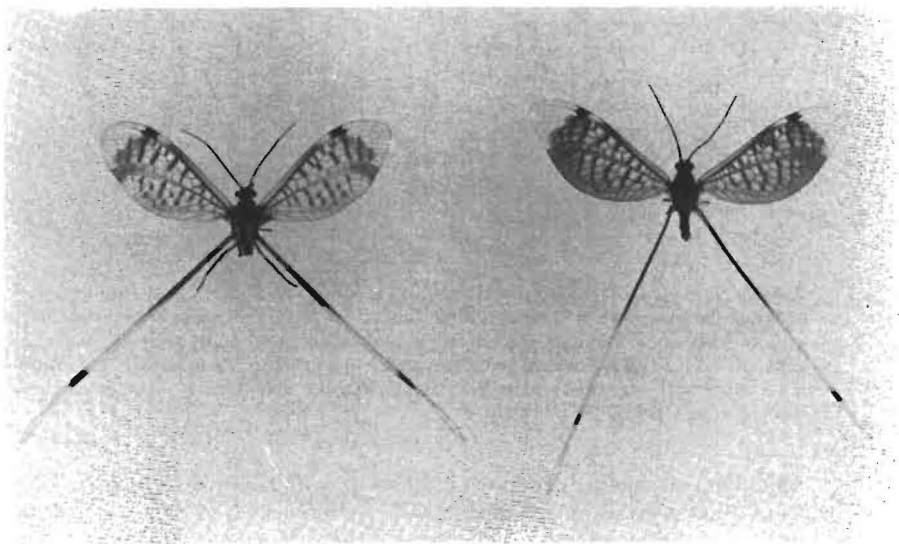
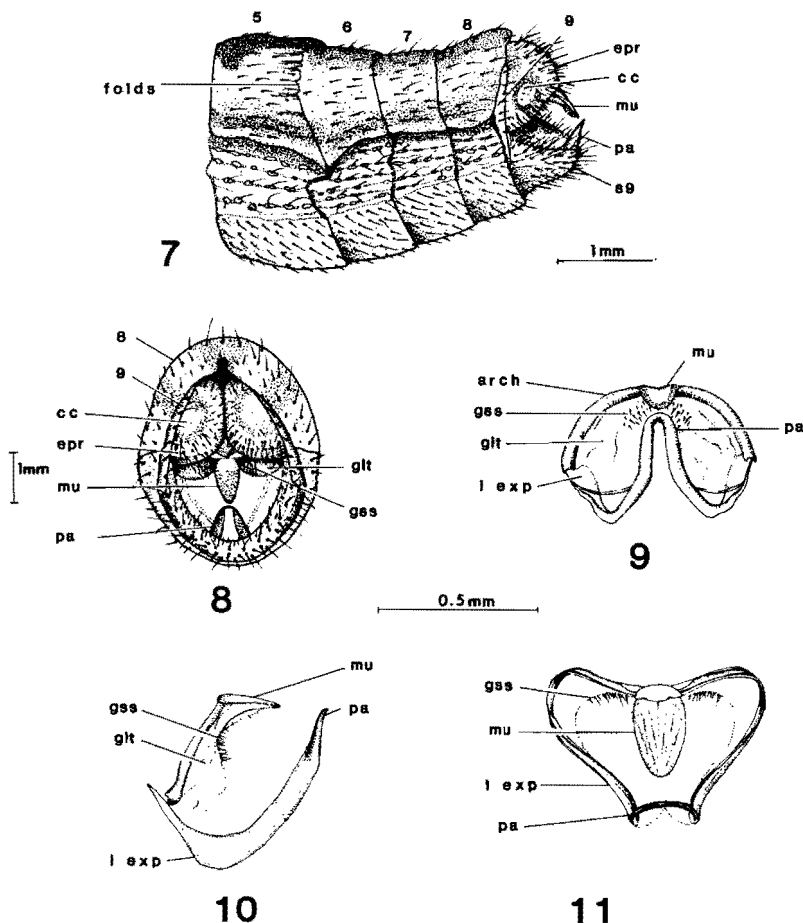


Fig. 6. *Knersulaktia nigroptera* gen. et sp. nov. Male and female (paratypes). Note sexual dimorphism in wing shape and pattern. (Abdomen of female removed) $\times 1.7$.



Figs 7–11. *Knersolaktia nigroptera* gen. et sp. nov. Abdomen and genitalia of ♂. 7. Abdomen (lateral view). 8. Abdomen (posterior view). 9. Gonarcus and parameres (posterior view). 10. Gonarcus and parameres (lateral view). 11. Gonarcus and parameres (dorsal view). 5, 6, 7 and 8 – tergites; epr – ectoproct; cc – callus cerci; mu – mediuncus; pa – paramere; Sg – sternite 9; glt – gonolatus; gss – gonosetae; l. exp – laminar expansion.

patches are present before and after the dark patch, the distal white patch covering the large pterostigma. Apical costal cross veins coloured white, other veins dark brown except for Sc and R, which are pink and maroon respectively. Cross veins coloured darkest. Oblique cross vein r-m present. 27 cross veins present before pterostigma (25–32). Nine cross veins present after pterostigma. Sc and R anastomose after pterostigma. Venation in female as in male. Colour pattern intricate (Fig. 6). Most of the wing save the apical region marked in deep smokey brown (lighter than in male). Large portions of

the distal region hyaline. The darkest pigmentation is found towards the hyaline apical tip of the wing and over most of the cross veins. Costal area coloured as in the male. 25 costal cross veins present before pterostigma, nine cross veins after the pterostigma. Hindwing in male $2.1 \times$ length of forewing. Very thin and ribbon-like, not dilated apically, but slightly narrower proximally. Ninety degree twist in apical region of hindwing as in the other genera. Pterostigma distinct. Macrotrichia on inner proximal region of hindwing rather long and dense. Hindwing dark pink proximally, shading to white after $\frac{2}{3}$ of its length. A small dark brown region proximal to the pterostigma interrupts the white (Fig. 6). Hindwing of female similar to that of the male, but with macrotrichia on inner border of proximal region shorter and less dense. Hindwing $2 \times$ length of forewing.

Abdomen stout in both sexes; brightly coloured with two citrine dorsolateral stripes, pink pleura and citrine sternites. In the male (alcohol preservation, Figs. 7 and 8) abdomen having citrine ground colour, with single mid-dorsal brown stripe and two longitudinal brown stripes dorsal to the pleura. Pleura bicoloured; brown dorsally and pink ventrally. Sternites uniform citrine. Large pleuritocavæ present. Posterior margin of tergite 5 fluted and anterior margin of tergite 6 with thin flange touching the posterior margin of tergite 5. Tergite 9 divided in two, not fused dorsally. Ectoprocts free dorsally (Fig. 8); callus cerci distinct, white, bearing a few very fine white hairs. Sternite 9 short, not extending much beyond tergite 9. Gonarcus arch broad, with straight transverse process (Figs 9, 10 and 11). Mediuncus simple and large; parameres fused apically and bearing large laminar expansions proximally (Fig. 9). Gonolatus large and slightly sclerotized; two dense lateral patches of gonosetae present. Abdomen in the female (Fig. 12) more brightly coloured than in the male; bright citrine ground colour with dorsal and lateral chocolate brown longitudinal stripes. Pleura pink, sternites bright citrine. Ectoprocts and gonapophyses lateralis is shaped as in Fig. 12. Callus cerci present. Tergite 9 narrow dorsally and bearing downward projecting distal lobe. Sternite 8 of similar shape to tergite 8, but somewhat narrower.

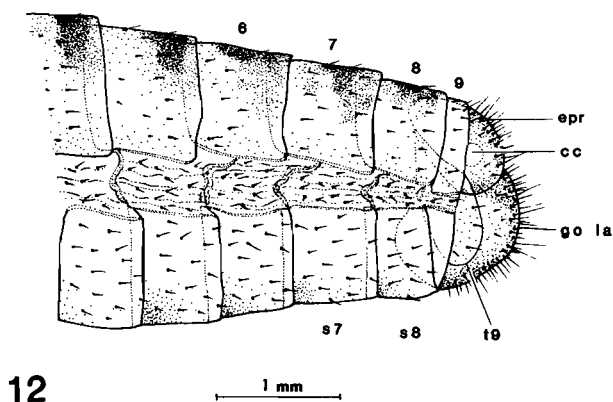
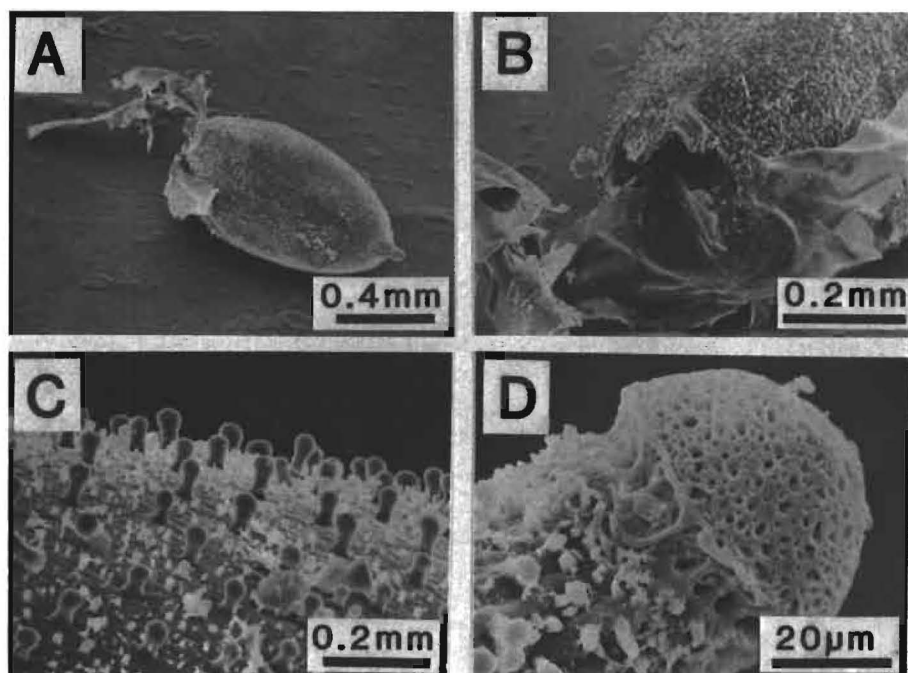


Fig. 12. *Knersulaktia nigroptera* gen. et sp. nov. Abdomen of ♀ (lateral view). 6, 7, 8 and 9 – tergites; epr – ectoprocts; cc – callus cerci; gl – gonapophyses lateralis; S7, S8 – sternites.



Figs 13 A–C. Egg of *Knersvlaktia nigroptera*. A. Entire egg showing attachment membrane and micropylar region. B. Proximal region of egg showing attachment membrane. C. Surface of egg covered in papillae. D. Porous cap covering micropylar region.

Egg (Fig. 13 A–D). Oval, somewhat elongate, 0.92 mm long ($n = 8$). Eggs glued by the female to the substrate by a basal adhesive attachment membrane. In captivity the eggs were glued in a vertical position. The chorion is evenly covered in papillae – aeropyles are not evident. Distally the micropyle is surrounded by a small cap pierced with pores.

MATERIAL EXAMINED. Holotype ♂; ♀ paratype and 2 ♂ paratypes. *SOUTH AFRICA*: Cape Province, 23 km north of Van Rhynsdorp in the 'Knervlakte'. 3 km west of Rooiberg turnoff from the national road (32° 26' S 18° 39' E), 19.viii.1983. Holotype ♂ and paratype ♀ deposited in National Collection of Insects, Plant Protection Research Institute, Pretoria; 2 paratype ♂ deposited in collection of the South African Museum, Cape Town.

Habitat and biology

The insects were netted at about 11h00 on a warm day. The habitat comprises highly succulent dwarf shrub vegetation (Werger, 1978), dominated by 'mesems' (Aizoaceae), various Compositae and other dwarf shrubs. The soil is extremely saline in parts, supporting halophytic communities. Characteristic of the area are extensive



Fig. 14. Habitat of *Knersvlaktia nigroptera*, 20 km north of Van Rhynsdorp, Namaqualand. The clayey soil supports a community of dwarf shrubs dominated by the succulent mesembryanthemums (Aizoaceae). Various 'mesems' were in flower at the time of capture.

plains of white quartz pebbles on sandy substrates, with dwarf succulents. The insects were found in an area with greater vegetation cover of the succulent dwarf shrub kind (fig. 14). All individuals were observed resting on the ground, frequently clear of vegetation cover. Activity of the insects increased towards midday, when they became extremely active, taking flight when approached to within 2 metres. Flight in the strong winds was rapid and strong, but not sustained, and the insects would soon resettle, walking round in a small circle on the ground in a manner similar to that characteristic of Lycaenid butterflies. Specimens survived for a week in captivity, one female laying 13 eggs which were firmly glued to the bottom of the container.

DISCUSSION

Knersvlaktia possesses a unique combination of characters, most of which are found individually in other nemopterine genera. These include pleuritocavae, which are found in *Nemopterella* and *Palmipenna*; densely hairy antennal base and head, found in *Barbibucca*; and a distinct hindwing pterostigma – characteristic of *Palmipenna* and *Barbibucca*, and developed to a lesser extent in *Nemia* and *Nemopterella*. In addition, this genus departs radically from the typical South African nemopterine form with respect to the unusually heavily pigmented wings. The only other genus possessing richly pigmented wings is the southern European *Nemoptera*, with wings coloured brown and yellow (Tjeder, 1967). Limited pigmentation is found on the wings of certain South African genera; in *Nemia* pigment blotches are found between the costal cross veins, in *Nemopterella* spots are present over the costal veins and in *Barbibucca* the costal region is shaded brown.

In general body form *Knersvlaktia* resembles *Nemopterella*, but differs in the following characteristics. The entire head region of all *Nemopterella* species is devoid of hairs of any kind, while in *Knersvlaktia* the head of the male is pubescent, especially around the eyes (the female has sparser pilosity on the head region, a dimorphism also found in *Barbibuca elegans*). In male *K. nigroptera* the base of the antennae are covered in long dense hairs, represented in the female by short bristles. The antennae of all *Nemopterella* species are devoid of hairs save the small setae characteristic of all nemopterine antennae. In all 22 species of *Nemopterella* (save *N. africana*) the distal antennal segments show sexual dimorphism between the sexes, the males having a bare membranous patch on the apical segment. In *Knersvlaktia*, the antennal tip of both sexes is similar, with no membranous patch in the male. The powdery macroscopic appearance of the thorax of all *Nemopterella* species owes its presence to numerous scale-like enlarged microtrichia; these are absent in *Knersvlaktia*. Pigmentation on the forewing of nearly all *Nemopterella* species is localized, and restricted to drop-like spots over the costal veins. The pigmentation of the costal area of *Knersvlaktia* follows the pattern found in *Nemia*, where the area between the cross veins is shaded. In *Knersvlaktia* the pigmentation of the hindwing stalk (dark pink) and the thorax and abdomen (pink and yellow) is unlike that of *Nemopterella*, and more like that found in *Barbibuca*. The forewing of *Knersvlaktia* is broader and shorter than that of any other South African genus.

Ecologically *Knersvlaktia* is also distinctive when compared to other South African nemopterines: emergence occurred in August, a month before the emergence of all other known South African genera. The emergence pattern of other genera is apparently seasonal within a specific climatic region (in spite of annual climatic vagrancies) e.g. in the winter rainfall region of the south-western Cape, *Palmipenna* emerges from September to November, *Barbibuca* from September to October, *Nemia* from October to November, *Nemopterella* from October to November, and *Nemeura* from December to January.

The function of the richly pigmented forewings in *Knersvlaktia* is obscure. The family is probably more diurnal than previously thought (adult *Palmipenna* have been found feeding on Compositae and *Grielim* flowers) (Mansell, M & Whitehead, V – pers. comm.). Thus the high contrast banding pattern found on the forewing of *Knersvlaktia*, and on the hindwings of nearly all species of South African nemopterines may serve a visual signalling function. Nevertheless, the possibility of a thermoregulatory, or startle rôle for the forewings of *Knersvlaktia* cannot be dismissed.

ACKNOWLEDGMENTS

Dr Dave Johnson is thanked for his aid in capturing the insects; Dr V. Whitehead and Ms M. McPhearson of the South African Museum kindly arranged for the loan of comparative material and Mr D. Gerneke helped with the production of the electron micrographs.

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Accepted 15 March 1984